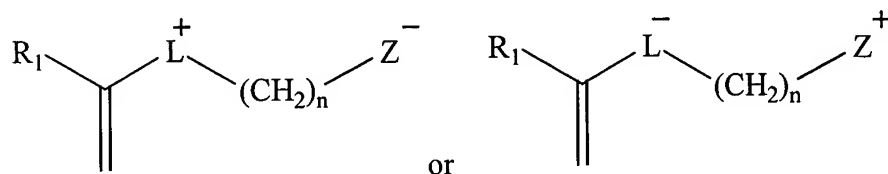


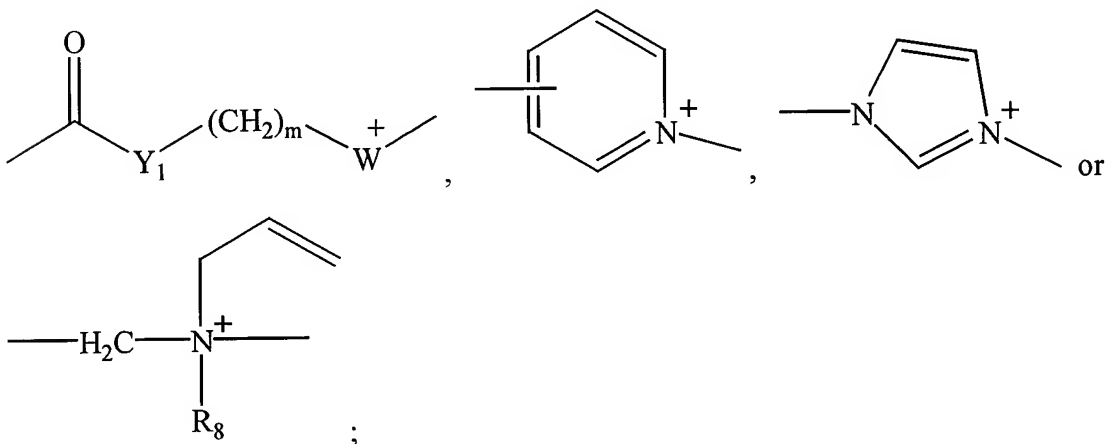
## WHAT IS CLAIMED IS:

1. A high molecular weight water-soluble charged polymer comprising from about 50 to about 99.8 mole percent one or more nonionic monomers, from about 0.1 to 9.9 mole percent of one or more cationic or anionic monomers, and from about 0.1 to about 49.9 mole percent of one or more zwitterionic monomers of formula

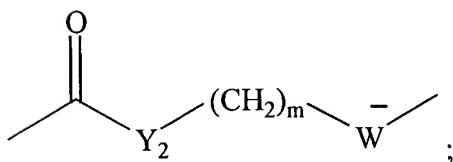


wherein

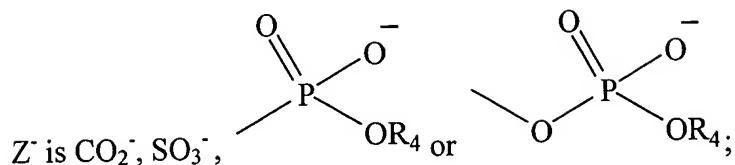
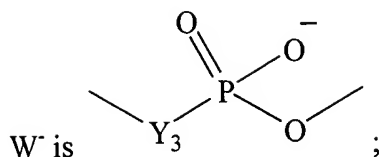
$\text{L}^+$  is a group of formula



$\text{L}^-$  is a group of formula



$\text{W}^+$  is  $-\text{S}^+\text{R}_3-$  or  $-\text{N}^+\text{R}_2\text{R}_3-$ ;



$Z^+$  is  $-\text{N}^+\text{R}_5\text{R}_6\text{R}_7$ ;

$\text{R}_1$  and  $\text{R}_8$  are independently hydrogen or methyl;

$\text{R}_2$ ,  $\text{R}_3$ ,  $\text{R}_4$ ,  $\text{R}_5$ ,  $\text{R}_6$  and  $\text{R}_7$  are independently selected from hydrogen and  $\text{C}_1$ - $\text{C}_4$  alkyl;

$\text{Y}_1$ ,  $\text{Y}_2$ , and  $\text{Y}_3$  are independently selected from O or  $\text{NR}_2$ ;

m is 2 or 3; and

n is 1-5.

2. The polymer of claim 1 wherein the cationic monomers are selected from the group consisting of dimethylaminoethylacrylate methyl chloride quaternary salt, diallyldimethylammonium chloride, (3- acrylamidopropyl)trimethylammonium chloride, (3-methacrylamido)propyltrimethylammonium chloride, dimethylaminoethylmethacrylate methyl chloride quaternary salt and dimethylaminoethylacrylate benzylchloride quaternary salt.

3. The polymer of claim 1 wherein the anionic monomers are selected from the group consisting of acrylamidopropanesulfonic acid, acrylic acid, methacrylic acid, monoacryloxyethyl phosphate and their sodium salts.

4. The high molecular weight water-soluble polymer of claim 1 comprising about 95 to about 99.8 mole percent of a nonionic monomer, about 4.9 to about 0.1 mole percent of a zwitterionic monomer and from about 4.9 to about 0.1 mole percent of a cationic monomer.

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5. The high molecular weight water-soluble polymer of claim 1 comprising about 95 to about 99.8 mole percent of a nonionic monomer, about 4.9 to about 0.1 mole percent of a zwitterionic monomer and from about 4.9 to about 0.1 mole percent of an anionic monomer.

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6. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomers are selected from acrylamide, methacrylamide, *N*-methacrylamide, *N*, *N*-dimethyl(meth)acrylamide, *N*-isopropyl(meth)acrylamide, *N*-(2-hydroxypropyl)methacrylamide, *N*-methyllolacrylamide, *N*-vinylformamide, *N*-vinylacetamide, *N*-vinyl-*N*-methylacetamide, poly(ethylene glycol)(meth)acrylate, poly(ethylene glycol) monomethyl ether mono(meth)acrylate, *N*-vinyl-2-pyrrolidone, glycerol mono((meth)acrylate), 2-hydroxyethyl(meth)acrylate, vinyl methylsulfone and vinyl acetate.

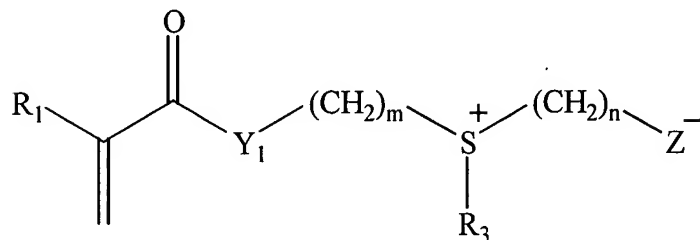
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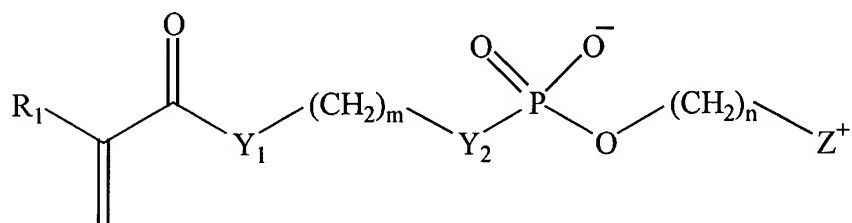
7. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomers are selected from acrylamide and methacrylamide.

8. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide.

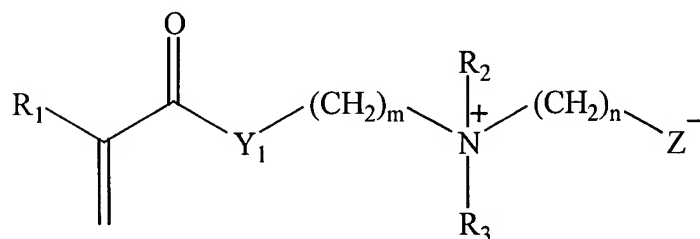
9. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide and the zwitterionic monomer is



10. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide and the zwitterionic monomer is



11. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide and the zwitterionic monomer is



12. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide and the zwitterionic monomer is selected from

*N,N*-dimethyl-*N*-acryloyloxyethyl-*N*-(3-sulfopropyl)-ammonium betaine,

*N,N*-dimethyl-*N*-acrylamidopropyl-*N*-(2-carboxymethyl)-ammonium betaine,

5 *N,N*-dimethyl-*N*-methacryloyloxyethyl-*N*-(3-sulfopropyl)-ammonium betaine,

*N,N*-dimethyl-*N*-methacrylamidopropyl-*N*-(3-sulfopropyl)-ammonium betaine,

2-(methylthio)ethyl methacryloyl-S-(sulfopropyl)-sulfonium betaine,

2-[(2-acryloyl)ethyl]dimethylammonio]ethyl 2-methyl phosphate,

2-(acryloyloxyethyl)-2'-(trimethylammonium)ethyl phosphate and

10 [(2-acryloyl)ethyl]dimethylammonio)methyl phosphonic acid.

13. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide and the zwitterionic monomer is selected from

*N,N*-dimethyl-*N*-acryloyloxyethyl-*N*-(3-sulfopropyl)-ammonium betaine,

15 *N,N*-dimethyl-*N*-acrylamidopropyl-*N*-(2-carboxymethyl)-ammonium betaine,

*N,N*-dimethyl-*N*-methacryloyloxyethyl-*N*-(3-sulfopropyl)-ammonium betaine and

*N,N*-dimethyl-*N*-methacrylamidopropyl-*N*-(3-sulfopropyl)-ammonium betaine.

14. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide, the zwitterionic monomer is

*N,N*-dimethyl-*N*-methacrylamidopropyl-*N*-(3-sulfopropyl)-ammonium betaine and the cationic monomer is dimethylaminoethylacrylate methyl chloride quaternary salt.

15. The high molecular weight water-soluble polymer of claim 1 wherein the nonionic monomer is acrylamide, the zwitterionic monomer is

*N,N*-dimethyl-*N*-methacrylamidopropyl-*N*-(3-sulfopropyl)-ammonium betaine and the anionic monomer is 2-acrylamido-2-methyl propane sulfonic acid sodium salt.

16. A method for increasing retention and drainage in fibrous suspensions of pulp during processing of said pulp comprising adding to the pulp an effective flocculating amount of the high molecular weight water-soluble polymer of claim 1.

5 17. The method of claim 16 further comprising adding bentonite, synthetic clays, microparticles, or resin enhancers to the pulp.

18. The method of claim 16 further comprising adding coagulant to the pulp.

10 19. A method of removing suspended solids and clarifying white water in the papermaking process comprising adding to the white water, pulp washers, or thickeners an effective flocculating amount of the high molecular weight water-soluble polymer of claim 1.

15 20. A method of increasing filler retention in a papermaking furnish comprising adding an effective flocculating amount of the high molecular weight water-soluble polymer of claim 1 to the filler slurry prior to addition to the papermaking furnish.